10. Time Zones

Program Name: Timezones.java Input File: timezones.dat

It's interview season and you've managed to land a ton of on-site interviews with different companies. Unfortunately, these companies are situated all over the world and you're having a hard time scheduling the interviews because of all the time differences.

You decide that you need an easier way to convert between these time zones. Why not a program? You quickly put together a list of different time zones and their respective UTC offsets. Your plan is to feed this list, along with the times that you want to convert, into your program and get back a list of converted times.

You can assume that no two time zones will have the same name. Two different time zones could, however, have the same UTC offset.

Input

The first line of input contains two space-separated integers, *n* and *m*, where *n* is the number of time zones and *m* is the number of times to convert.

The next *n* lines contain the *n* different time zones. Each time zone is on its own line and follows this format:

```
CST -06:00
```

where `CST` is replaced with the name of the time zone and `-06:00` is replaced with the respective UTC offset.

The next *m* lines each represents a time to convert. The format for these conversions look like the following:

```
01:20 CST => PST
```

You can assume that times will be given in standard 24-hour military time (00:00 to 23:59).

Output

For each time to convert, print the converted time. Ignore any day changes, and simply print the local time at the destination time zone that corresponds to the local time at the origin time zone.

Constraint

```
1 <= n <= 20
1 <= m <= 100
1 <= length of time zone names <= 16
-12:00 <= UTC offsets <= +14:00
```

Example Input File

```
3 3
CST -06:00
PST -08:00
IST +05:30
12:00 CST => PST
10:00 PST => CST
19:30 PST => IST
```

Example Output to Screen

```
10:00 PST
12:00 CST
09:00 IST
```